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Use of a modified Delphi approach to develop research priorities in HPB surgery across the United Kingdom

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Abstract

Background

Research prioritisation can help identify clinically relevant questions and encourage high-quality, patient-centred research. Delphi methodology aims to develop consensus opinion within a group of experts, with recent Delphi projects helping to define the research agenda and funding within several medical and surgical specialties.

Methods

All members of the Association of Upper Gastrointestinal Surgeons (AUGIS) were asked to submit clinical research questions using an online survey; Phase 1). Two consecutive rounds of Delphi prioritisation by multidisciplinary HPB healthcare professionals (Phase 2) were undertaken to establish a final list of the most highly prioritised research questions. A multidisciplinary steering committee analysed the results of each phase.

Results

Ninety-three HPB-focussed questions were identified in Phase 1, with thirty-seven questions of sufficient priority to enter a further prioritisation round. A final group of 11 questions considered highest priority were identified. The most highly ranked research questions related to treatment pathways, operative strategies and the impact of HPB procedures on quality of life, particularly for malignant disease.

Discussion

Expert consensus has identified research priorities within the UK HPB surgical community over the coming years. Funding applications, to establish well-designed, high quality collaborative research are now required to address these questions.

Key words

Liver; pancreas; biliary; cancer; Delphi

Introduction

Methodological and practical difficulties present unique challenges to the surgical research community¹, with research quality historically variable and often poor^{1,2}. Integration of research and practice through a collaborative approach can often overcome such challenges³ and enhance research impact, such as the Dutch Pancreatic Cancer Group in hepato-pancreato-biliary (HPB) surgery⁴⁻⁶.

Identifying a national consensus on research priorities provides the opportunity to increase value and reduce waste in HPB research⁷. Furthermore, the engagement of stakeholders in research encourages the development of clinically relevant research priorities and the potential for national collaboration in HPB research. Using structured prioritisation methods to achieve consensus can maximise relevance, guide funding bodies and channel resources.

The modified Delphi methodology can be utilised to produce consensus within a group of experts by interaction to reduce individual bias. These methods have previously identified research questions in orthopaedic⁸ and colorectal surgery⁹, with outputs frequently receiving pump-priming or significant funding following identification¹⁰⁻¹². However, to the authors knowledge, clinical priority setting in HPB surgery is yet to be performed.

The aim of this work is to identify a list of highly prioritised clinical research questions in HPB surgery using a modified Delphi approach to guide future research and funding bodies.

Methods

A modified Delphi approach was performed with two distinct phases, including two rounds of prioritisation (Figure 1) using methodology previously described across a broad range of medical topics^{9,13,14}. Throughout the process, stakeholders were encouraged to consider prioritisation responses based on disease burden, clinical relevance and answerability - factors identified as facilitators of high-impact research¹⁵. During each round, any incomplete questionnaires were excluded prior to analysis.

Phase one

Healthcare professionals within the AUGIS membership were asked to submit potential research questions across upper gastrointestinal and HPB surgery via an online survey. This was open to both medical professionals and multidisciplinary team members, with no limit on the number of research questions an individual could submit. The survey was open for at least six weeks, with at least one reminder email was sent during this period and through social media platforms to increase engagement with the process.

All submitted questions were then grouped into four categories independently (hepato-pancreato-biliary, malignant upper gastrointestinal surgery, benign upper gastrointestinal surgery or bariatric surgery), with any disagreements resolved by consensus. HPB-focussed questions were then screened, with duplicate questions removed and similar questions streamlined following discussion by the steering group. Where questions related to an identical clinical research problem, questions were combined by group consensus. Where wording of questions was altered, agreement was reached within the steering group and care was taken not to alter the meaning of original questions posed.

Due to the separate sub-speciality interest within clinical practice, questions relating to the other three categories (malignant upper gastrointestinal surgery, benign upper gastrointestinal surgery and bariatric surgery) were each taken forward by individually selected and speciality-orientated steering groups.

Steering committee

The steering committee for the Delphi process contained two surgical registrars (SK, SP), a cancer nurse specialist (LJ), patient and public representation (HD), a medical oncologist with specialist interest in HPB disease (AC) and three consultant HPB surgeons (JR, EMH, MT). Representation from within the Association of Upper Gastrointestinal Surgeons (AUGIS) committee (Education, Training and Research Lead; MT) was also present.

Phase two

The collated list of research questions was then prioritised by attendees at the Great Britain and Ireland Hepato-Pancreato-Biliary Association (GBIHPBA) conference, March 2018, using printed questionnaires (*Prioritisation Round 1*). Healthcare professionals with a speciality interest in HPB surgery were asked to prioritise each individual research question based on their own opinion using a Likert scale (1 – low priority, 3 – neutral, 5 – high priority), in accordance with similar Delphi processes^{8,9,13,14}.

Scores were reviewed with a ‘cut-off’ point determined based on mean priority score and steering group consensus to select those questions to move through to the final round.

Heterogeneity of responses was also examined by the steering committee to ensure ‘block’ voting was not performed. To ensure higher-level evidence did not already exist, a literature search of each remaining question was conducted prior to inclusion.

A second round of prioritisation was then performed by the GBIHPBA membership via a further online survey, with healthcare professionals asked to prioritise each question using the same Likert scale as the previous round. Again, respondents were given a minimum of six weeks with reminders sent through email and social media during this period. Results were reviewed by the steering committee to identify a final group of highly prioritised questions, with consensus reached by analysing the mean priority score and proportion of high priority responses each question received.

Results

A total of 427 research questions were produced by 140 respondents, representing 48% of the membership (Figure 2). Sub-specialisation in HPB surgery was declared by 47 (34%).

Overall 153 (36%) research questions were HPB-focused. A summary of question topic in each round of the prioritisation exercise is shown in Table 1.

After duplicated and similar questions had been combined, 93 questions were moved forward into round 2. These research questions were prioritised by 44 respondents, representing 44% of the conference attendees, with a further four responses excluded due to incompleteness.

Assessment of ranking heterogeneity excluded one further response due the possible presence of 'block' ranking (only priority ranks of 1 or 5 present). Following steering committee review, a consensus was reached regarding a cut-off value (mean priority score of ≥ 3.0) and a total of 37 questions were brought forward into the last round (Supplementary Table 1).

In the final round 42 respondents prioritised these 37 questions, with three excluded due to incompleteness. Following steering committee review of responses, a consensus was again reached regarding cut-off value (questions receiving $>50\%$ high priority ranking (grade 4 or 5) in combination with a mean priority score of ≥ 3.5 ; and $<20\%$ low priority ranking (1 or 2); Supplementary Table 2) to produce 11 final highly prioritised questions (Box 1). Across the three rounds consultant representation remained above 50% and group demographic remained similar (Figure 3).

Discussion

A list of 11 high priority research topics in HPB surgery have been derived through a modified Delphi process.

A high proportion of these topics related to malignant disease, particularly regarding improving outcomes in pancreatic cancer and the operative management of colorectal cancer liver metastases. This is expected, particularly as they represent a high burden of disease^{16,17}, significant reduction in patient's quality of life and potential for improvement in survival outcomes^{16,18}. Furthermore there is considerable debate regarding these diseases if one considers the potential roles of neoadjuvant therapy or pathways to surgery among patients with pancreatic cancer and of two stage liver resection (Associating Liver Partition and Portal vein Ligation for Staged hepatectomy (ALPPS) in particular). In the case of pancreatic cancer, early stage disease detection and the development of new treatment strategies have previously been identified as priorities eight years ago¹⁹. Progress within these domains has since been made, however they may remain high priorities due to difficulties in translating basic research to bedside²⁰ and persistent complexities within surgical research²¹.

A national quality improvement programme for iatrogenic common bile duct injury was sufficiently prioritised for consideration in the final group of questions (Supplementary Table 2), however nearly a quarter of respondents (24%) ranked this question as low priority (grade 1 or 2). Due to priority rank heterogeneity and unanimous concern within the steering committee regarding difficulties in feasibility of delivering change at a national level, this question was not included within the final list. Thus, this Delphi process highlights areas where further review or data is required before those areas are the focus of study/improvement. All final round questions have been published here for transparency and

to acknowledge that a proportion of questions are linked by topic or clinical management algorithms. In addition, differences in patient prioritisation may exist and as academic advances are achieved they may develop higher priority in the coming years. The authors also acknowledge that current ongoing studies, of which current progress and results are unknown, may answer some of the high-ranked questions. It is hoped this process will support any conclusions regarding the clinical significance of their findings.

Greater representation of benign and/or complex biliary disease may have been anticipated, particularly as it represents a significant disease burden and associated clinical workload²². Biliary sub-speciality interest was well represented across each round (data not shown) and therefore this is unlikely to explain their absence in the final set of topics for suggested review. It is possible that questions relating to biliary disease will be prioritised in the upper gastrointestinal surgery Delphi exercise run in parallel to this study, or that bias exists within the UK system towards cancer-based questions due to the focus on development of cancer care centres.

Throughout the prioritisation process, clinicians have been integral to identifying critical priorities in the surgical management of HPB disease, avoiding potential mismatches between those questions clinicians wish to be addressed in research and those questions that researchers choose to investigate^{7,23,24}.

The use of a large cohort of healthcare professionals through the AUGIS and GBIHPBA membership has reduced reporter bias and set priorities using a large multi-disciplinary cohort containing healthcare professionals representing both clinical and academic foci. While a variety of methods have been described to determine consensus, there is no

agreement as to the best approach²⁵. Therefore the 'certain level of agreement' method was adopted as this is the most commonly used methodology in consensus-based methodology.

Low member response rates could be highlighted as a limitation to this study, particularly as responses were received from less than half the membership in each round (47.6, 33.6 and 32% respectively). However, similar studies using Delphi methodology have demonstrated lower response rates, with many quoting around 10 to 18%^{9,14}. This suggests adequate engagement in the process and represents the largest collation of expert opinion on HPB research priorities to date.

The use of paper questionnaires could have introduced the potential for respondents to readily identify questions of particular interest in block voting during phase 2, particularly as questions were presented in identical order. However the assessment of rank heterogeneity identified only one response where this may have occurred, suggesting the introduction of bias remained limited.

This study also highlights the process of developing a national consensus statement for HPB research priorities. The final priority list may differ from other geographical and cultural settings, however this process could be utilised by other national and international groups to perform further Delphi prioritisation exercises specific to unanswered research questions prominent within their surgical community.

Within the steering group a patient representative reviewed questions during phase two to ensure patient relevance and interpretation of question structure. However, exploration of patient perceptions and validation of the final question group with a larger cohort is required

to ensure patient-centred research is achieved^{7,25}. The development of clinical vignettes through patient and public involvement may also help further guide funding bodies, similar to the work performed by McNair et al following the similar process performed for colorectal surgery²⁶.

The questions will be disseminated to funding bodies and encourage championing of individual research questions by AUGIS members. Meanwhile, the newly appointed AUGIS pancreatic cancer research lead, a joint initiative with Pancreatic Cancer UK and Pancreatic Cancer Research Fund, will provide a platform on which such questions can be answered. It is anticipated the output from the current study will set the research agenda in HPB surgery and hope it will further encourage contribution to planned research and collaboration between centres over the coming years.

In summary this Delphi process has set high research priorities in HPB surgery, which it is hoped will align research agendas and principle users. Malignant disease was highly prioritised, relating to treatment pathways and specific operative strategies, together with the impact of HPB procedures on quality of life.

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Tables

Table 1. Question topics included in each round

Topic	Submitted in Phase 1	Collated questions in Round 2 voting	Highest scores for Round 3 voting	Final list of prioritisation research questions
Total	153*	93	37	11
Cancer	49	31	17	5
Benign	21	13	3	-
Surgical technique	19	13	3	1
Complications	13	8	1	-
Prehabilitation	9	5	2	1
Screening	8	4	2	1
Liver transplant	3	3	2	-
Perioperative	5	3	1	-
Chronic pancreatitis	4	2	2	1
Palliative care	4	2	-	1
Education	1	1	-	-
Miscellaneous	17	8	4	1

*Overall 427 questions were produced in phase 1, of which 153 were hepato-pancreato-biliary (HPB) focused

Box 1. Final group of prioritised research questions in HPB surgery*

Pancreas

1. How do you identify patients with resectable pancreatic cancer who would benefit from neoadjuvant chemotherapy and/or radiotherapy? Is there a role for surgical resection in patients with pancreatic cancer down staged by neoadjuvant chemotherapy and/or radiotherapy? In those patients with locally advanced disease, in whom should resection be offered?
2. Which blood and urine markers can identify early stage pancreatic cancer?
3. Does fast track surgery for pancreatic carcinoma improve overall outcome in terms of reduced morbidity and improved survival? Which patient cohort is suitable for fast-track surgery and in whom should biliary drainage be performed pre-operatively?
4. What is the natural history of intraductal papillary mucinous neoplasms? How should patients with detected lesions be managed?
5. In patients at high risk of pancreatic cancer, either hereditary or chronic pancreatitis, what is the optimal radiological surveillance (modality and frequency)?

Liver

6. In patients with colorectal cancer and synchronous liver metastases, which patients benefit from combined primary site surgery and metastasectomy?
7. Is there a role for genetic or molecular prognostic/predictive markers in selecting patients for resection of colorectal liver metastases? What is the role of biological agents in colorectal liver metastases and what prognostic markers improve outcomes?
8. For patients with bilobar colorectal liver metastases in whom a single stage resection is not feasible, which technique is superior with regard to oncological outcomes and patient-reported outcomes - ALPPS or conventional 2-stage hepatectomy with portal venous embolization?

Cross-speciality

9. Does a prehabilitation programme, including the optimisation of nutrition, improve outcomes of HPB surgery?
10. What is the impact of the cancer nurse specialist on HPB patients, their clinical and patient-reported outcomes, and their carers?
11. How do we maximise quality of life and survival for patients with unresectable HPB cancer? What is the role of nutrition in this patient group?

*Note that these questions have been listed under topic headings and do not represent rank order

Figure legends

Figure 1. The modified Delphi process used to prioritise research questions in hepato-pancreato-biliary surgery

Figure 2. Overview of responses during modified Delphi process

Figure 3. Distribution of responder demographics through three rounds of prioritisation by clinical grade